Alternative Jet Fuel Qualification

CAAFI Mini Symposium
June 3, 2021

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Presentation Overview

Why Does ASTM Specification Issuance = Approval to Fly?
ASTM Qualification Process Overview

1. FAA Approved Operating Limitations Based on ASTM Fuel Specifications

2. D4054 SAJF Evaluation Process

3. D7566 Drop-In Jet Fuel Spec

4. D1655 = D7566

New SAF Meets Existing Operating Limitations, Therefore Approved to Use on Virtually All Existing Aircraft

ASTM Specification = Approval to Fly

If New SAF Meets Conventional Jet Fuel Spec & Properties

Then New SAF Annex Added to Drop-In Fuel Spec

Drop-in Fuel Only After Blending

Tested Before Blending with Conventional Jet Fuel

Jet A and Jet A-1 Fuel

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Over a Decade of Progress

- **May 24, 2006**: CAAFI Established
- **June 2009**: ASTM D7566 Issued
- **June 2009**: FT-SPK Annex A1
- **July 2011**: HEFA-SPK Annex A2
- **November 2015**: FT-SPK/A Annex A4
- **December 2019**: CHJ Annex A6
- **June 2009**: ASTMD4054 Issued
- **June 2014**: SIP Annex A3
- **April 2016**: ATJ-SPK Annex A5
- **June 2018**: Ethanol Feedstock Added
- **May 2020**: HC-HEFA Annex A7

**Commercial Aviation Alternative Fuel Initiative** (see www.caafi.org)

**Alternative Jet Fuel Annex**

**Drop-in Fuel Specification**

**Alternative Jet Fuel Evaluation Process**

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2. ASTM D4054 Evaluation Process

1. FAA Approved Operating Limitations Based on ASTM Fuel Specifications

2. D4054 SAJF Evaluation Process
   - If New SAJF Meets Conventional Jet Fuel Spec & Properties

3. D7566 Drop-In Jet Fuel Spec
   - Then New SAJF Annex Added to Drop-In Fuel Spec

4. D1655 = D7566
   - Conventional Jet Fuel Spec
   - Drop-In Jet Fuel Spec
Alternative Jet Fuels Must Be Drop-in Fuels

Formulate New Fuel to Meet Design & Operational Requirements of Existing Fleet of Engines & Aircraft
ASTM D4054 Evaluation Process

Tier 1:
- Specification Properties

Tier 2:
- Fit-For-Purpose Properties
- Phase 1 ASTM Research Report
- Astm D7566 Specification Annex

Tier 3:
- Component/Rig Testing

Tier 4:
- Engine/APU Testing
- Phase 2 ASTM Research Report

ASTM Balloting Process:
- Accept
- Reject
- Re-Eval As Required

OEM Review & Approval
- FAA Review

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Process Improvement: D4054 Clearinghouse

Structured as a Cost Share Arrangement

FAA Seed Money Under ASCENT Center of Excellence

University of Dayton Research Institute (UDRI)

Candidate AJF In

Final Research Report Out

Phase 2 ASTM Research Report

Phase 2 ASTM Research Report

Phase 1 ASTM Research Report

Phase 1 ASTM Research Report

Tier 4

Engine/APU Testing

Tier 3

Component/Rig Testing

Tier 2

Fill-For-Purpose Properties

Tier 1

Specification Properties

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Process Improvement: D4054 Fast Track Annex

Jet A Property and Compositional Range

D4054 Property and Compositional Objectives

Fast Track Target Values

Lite Testing Program For AJF’s with Nominal Jet Fuel Properties and Compositions

Limited to a 10% Blend Percentage
Process Improvement: Alternative Jet Fuel Pre-Screening

Pre-Screening Phase

Tier α

Property/Performance Predictions
- GCxGC,
- IR absorption, and/or
- NMR

Critical Properties
- DCN
- Density
- Distillation Curve
- Viscosity
- Surface Tension

Tier β

ml’s of test fuel

Optimize/Refine Conversion Process/Composition

Evaluation Phase

ASTM D4054

100’s to 1000’s of gallons of test fuel

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Thank You

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Questions?